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SENATE COUNCIL**1. General Information**

1a. Submitted by the College of: ARTS & SCIENCES

Date Submitted: 10/20/2015

1b. Department/Division: Chemistry

1c. Contact Person

Name: Arthur Cammers

Email: a.cammers@uky.edu

Phone: 8593238977

Responsible Faculty ID (if different from Contact)

Name: Mark Meier

Email: mark.meier@uky.edu

Phone: 8592573837

1d. Requested Effective Date: Semester following approval

1e. Should this course be a UK Core Course? No

2. Designation and Description of Proposed Course

2a. Will this course also be offered through Distance Learning?: No

2b. Prefix and Number: CHE 566

2c. Full Title: Organic Materials: Characterization and Devices

2d. Transcript Title: Org. Mat: Characterization and Devices

2e. Cross-listing:

2f. Meeting Patterns

LECTURE: 3

2g. Grading System: Letter (A, B, C, etc.)

2h. Number of credit hours: 3

2i. Is this course repeatable for additional credit? No

If Yes: Maximum number of credit hours:

If Yes: Will this course allow multiple registrations during the same semester?

2j. Course Description for Bulletin: A study of applications of organic materials in electronic and optical devices, focusing on appropriate material-selection, processing, and interpretation of device output. Will cover basic methods for the formation of thin films of organic molecules and polymers, various spectroscopic techniques relevant to device performance, and methods to form and measure devices such as transistors and light-emitting diodes. Hybrid organic-inorganic material systems, and complex device structures for all-organic circuitry will be discussed.

2k. Prerequisites, if any: CHE 232 and PHY 213 or PHY 232, or permission of the instructor

2l. Supplementary Teaching Component:

3. Will this course taught off campus? No

If YES, enter the off campus address:

4. Frequency of Course Offering: Spring,

Will the course be offered every year?: Yes

If No, explain:

5. Are facilities and personnel necessary for the proposed new course available?: Yes

If No, explain:

6. What enrollment (per section per semester) may reasonably be expected?: 25

7. Anticipated Student Demand

Will this course serve students primarily within the degree program?: Yes

Will it be of interest to a significant number of students outside the degree pgm?: No

If Yes, explain:

8. Check the category most applicable to this course: Not Yet Found in Many (or Any) Other Universities ,

If No, explain:

9. Course Relationship to Program(s).

a. Is this course part of a proposed new program?: No

If YES, name the proposed new program:

b. Will this course be a new requirement for ANY program?: Yes

If YES, list affected programs: BACHELOR of SCIENCE in CHEMISTRY- Materials Chemistry Option

10. Information to be Placed on Syllabus.

a. Is the course 400G or 500?: Yes

b. The syllabus, including course description, student learning outcomes, and grading policies (and 400G-/500-level grading differentiation if applicable, from **10.a** above) are attached: Yes

Distance Learning Form

Instructor Name:

Instructor Email:

Internet/Web-based: No

Interactive Video: No

Hybrid: No

1. How does this course provide for timely and appropriate interaction between students and faculty and among students? Does the course syllabus conform to University Senate Syllabus Guidelines, specifically the Distance Learning Considerations?

2. How do you ensure that the experience for a DL student is comparable to that of a classroom-based student's experience? Aspects to explore: textbooks, course goals, assessment of student learning outcomes, etc.

3. How is the integrity of student work ensured? Please speak to aspects such as password-protected course portals, proctors for exams at interactive video sites; academic offense policy; etc.

4. Will offering this course via DL result in at least 25% or at least 50% (based on total credit hours required for completion) of a degree program being offered via any form of DL, as defined above?

If yes, which percentage, and which program(s)?

5. How are students taking the course via DL assured of equivalent access to student services, similar to that of a student taking the class in a traditional classroom setting?

6. How do course requirements ensure that students make appropriate use of learning resources?

7. Please explain specifically how access is provided to laboratories, facilities, and equipment appropriate to the course or program.

8. How are students informed of procedures for resolving technical complaints? Does the syllabus list the entities available to offer technical help with the delivery and/or receipt of the course, such as the Information Technology Customer Service Center (<http://www.uky.edu/UKIT/>)?

9. Will the course be delivered via services available through the Distance Learning Program (DLP) and the Academic Technology Group (ATL)? NO

If no, explain how student enrolled in DL courses are able to use the technology employed, as well as how students will be provided with assistance in using said technology.

10. Does the syllabus contain all the required components? NO

11. I, the instructor of record, have read and understood all of the university-level statements regarding DL.

Instructor Name:

SIGNATURE|YATES|S W Yates|CHE 566 NEW Dept Review|20150702

SIGNATURE|ACSI222|Anna C Harmon|CHE 566 NEW College Review|20151110

SIGNATURE|JMETT2|Joanie Ett-Mims|CHE 566 NEW Undergrad Council Review|20160311

SIGNATURE|ZNNIKO0|Roshan N Nikou|CHE 566 NEW Graduate Council Review|20160331

New Course Form

<https://myuk.uky.edu/sap/bc/soap/rfc?services=>

[Open in full window to print or save](#)

Generate R

Attachments:

[Browse...](#)

Upload File

ID	Attachment
Delete 6450	CHE 566 OrgMat Characterization and Devices UPDATE

(*denotes required fields)

1. General Information

- a. * Submitted by the College of: Submission Date:
- b. * Department/Division:
- c.
- | | | | |
|--|----------------|---------------------------|-------------------|
| * Contact Person Name: | Arthur Cammers | Email: a.cammers@uky.edu | Phone: 8593238977 |
| * Responsible Faculty ID (if different from Contact) | Mark Meier | Email: mark.meier@uky.edu | Phone: 8592573837 |
- d. * Requested Effective Date: Semester following approval OR Specific Term/Year¹
- e.
- Should this course be a UK Core Course? Yes No
- If YES, check the areas that apply:
- Inquiry - Arts & Creativity Composition & Communications - II
- Inquiry - Humanities Quantitative Foundations
- Inquiry - Nat/Math/Phys Sci Statistical Inferential Reasoning
- Inquiry - Social Sciences U.S. Citizenship, Community, Diversity
- Composition & Communications - I Global Dynamics

2. Designation and Description of Proposed Course.

- a. * Will this course also be offered through Distance Learning? Yes⁴ No
- b. * Prefix and Number:
- c. * Full Title:
- d. Transcript Title (if full title is more than 40 characters):
- e. To be Cross-Listed² with (Prefix and Number):
- f. * Courses must be described by at least one of the meeting patterns below. Include number of actual contact hours³ for each meeting pattern type.
- | | | | |
|--|--|---------------------------------|---------------------------------|
| <input type="text" value="3"/> Lecture | <input type="text"/> Laboratory ¹ | <input type="text"/> Recitation | <input type="text"/> Discussion |
| <input type="text"/> Indep. Study | <input type="text"/> Clinical | <input type="text"/> Colloquium | <input type="text"/> Practicum |
| <input type="text"/> Research | <input type="text"/> Residency | <input type="text"/> Seminar | <input type="text"/> Studio |
| <input type="text"/> Other | If Other, Please explain: | | |
- g. * Identify a grading system:
- Letter (A, B, C, etc.)
- Pass/Fail
- Medicine Numeric Grade (Non-medical students will receive a letter grade)
- Graduate School Grade Scale
- h. * Number of credits:
- i. * Is this course repeatable for additional credit? Yes No
- If YES: Maximum number of credit hours:
- If YES: Will this course allow multiple registrations during the same semester? Yes No

j. * Course Description for Bulletin:

A study of applications of organic materials in electronic and optical devices, focusing on appropriate material-selection, processing, and interpretation of device output. Will cover basic methods for the formation of thin films of organic molecules and polymers, various spectroscopic techniques relevant to device performance, and methods to form and measure devices such as transistors and light-emitting diodes. Hybrid organic-inorganic material systems, and complex device structures for all-organic circuitry will be discussed.

k. Prerequisites, if any:

CHE 232 and PHY 213 or PHY 232, or permission of the instructor

l. Supplementary teaching component, if any: Community-Based Experience Service Learning Both3. * Will this course be taught off campus? Yes No

If YES, enter the off campus address:

4. Frequency of Course Offering.

a. * Course will be offered (check all that apply): Fall Spring Summer Winter

b. * Will the course be offered every year? Yes No

If No, explain:

5. * Are facilities and personnel necessary for the proposed new course available? Yes No

If No, explain:

6. * What enrollment (per section per semester) may reasonably be expected? 25

7. Anticipated Student Demand.

a. * Will this course serve students primarily within the degree program? Yes No

b. * Will it be of interest to a significant number of students outside the degree pgm? Yes No

If YES, explain:

8. * Check the category most applicable to this course:

Traditional – Offered in Corresponding Departments at Universities Elsewhere

Relatively New – Now Being Widely Established

Not Yet Found in Many (or Any) Other Universities

9. Course Relationship to Program(s).

a. * Is this course part of a proposed new program? Yes No

If YES, name the proposed new program:

b. * Will this course be a new requirement⁵ for ANY program? Yes No

If YES⁵, list affected programs::

BACHELOR of SCIENCE in CHEMISTRY- Materials Chemistry Option

10. Information to be Placed on Syllabus.

a. * Is the course 400G or 500? Yes No

If YES, the *differentiation for undergraduate and graduate students must be included* in the information required in 10.b. You must include: (i) Ident additional assignments by the graduate students; and/or (ii) establishment of different grading criteria in the course for graduate students. (See SR

b. * The syllabus, including course description, student learning outcomes, and grading policies (and 400G-/500-level grading differentiation if appl 10.a above) are attached.

¹¹ Courses are typically made effective for the semester following approval. No course will be made effective until all approvals are received.

¹² The chair of the cross-listing department must sign off on the Signature Routing Log.

- In general, undergraduate courses are developed on the principle that one semester hour of credit represents one hour of classroom meeting per week for a semester, exclusive of any laboratory meeting. Laboratory meeting, generally, are two hours per week for a semester for one credit hour. (from SR 5.2.1)
- You must also submit the Distance Learning Form in order for the proposed course to be considered for DL delivery.
- In order to change a program, a program change form must also be submitted.

Rev 8/09

UK Department of Chemistry, CHE 566

Organic Materials: Characterization and Devices

Spring 2018 Course Description and Syllabus

Meeting Times: MWF 8:00-8:50 a.m.

Classroom: CP-111

Instructor: John Anthony, CP-150A , 257-0408, anthony@uky.edu

Office Hours: Mondays 9:00-11:50 a.m.

CHE 566 home page: <http://www.chem.uky.edu/courses/CHE 566>

Course Description:

A course on the use of organic materials in electronic and optical devices, focusing on appropriate material selection, processing, and interpretation of a device's output. The class will cover basic methods for the formation of thin films of organic compounds (both small molecules and polymers), various spectroscopic techniques to extract data relevant to device performance, and methods to form and measure devices such as transistors and light-emitting diodes. The class will then progress to cover both hybrid organic / inorganic material systems, along with more complex device structures necessary to create all-organic circuitry. Prerequisite: CHE 232 and PHY 213 or 232, or permission of the instructor.

Student Learning Outcomes:

After completing this course, the student will be able to:

1. Describe the basic approaches to the formation of high-quality organic films
2. Demonstrate the ability to recognize common design principles for materials destined for organic electronic devices.
3. Analyze experimental data to identify electronic characteristics of organic materials.
4. Describe the operation of organic transistors, light-emitting diodes, and photovoltaics.
5. Interpret device data obtained by the devices listed above, and use that data to evaluate the relative performance of the device.
6. Critically evaluate published literature in the field of organic electronic materials.

Course Goals/Objectives:

Carbon semiconductors promise to revolutionize modern consumer electronics. This course will provide students with a strong background in the operation of current-generation electronics (displays, microprocessors, solar cells), and introduce them to the fundamental concepts and properties of carbon-based compounds that allow them to serve as replacements for silicon electronics. Concurrently, students will be introduced to cutting-edge research progress in the area of carbon electronics, with strong focus on critical reading of the current materials literature.

Required Materials:

"Organic Electronics: Materials, Manufacturing, and Applications" edited by Hagen Klauk, 1st edition
Access to the chemical literature (Advanced Materials, Materials Horizon, and Chemistry of Materials)

Examinations:

There will be two in-class examinations, Feb. 14 and April 18. Any student with a legitimate conflict with an exam time must inform me in writing, according to university regulations (www.uky.edu/Registrar/bulletinCurrent/toc2.htm) by the Office of the Registrar.

Research paper:

For undergraduates, the final assignment for the class will be a literature survey, at least 8 pages in length, of a topic in organic electronics approved by the instructor. The final exam for undergraduates will be a 10-minute presentation of this paper to the class, with a presentation score assigned by the instructor.

The final project for this course for graduate students will be a research proposal, at least 8 pages in length, on a topic approved by the course instructor. The research proposal should suggest a promising new area of research in the field of organic electronics, and must be well grounded in the current literature in the field. The final exam for graduate students will consist of a 10 minute "elevator pitch" of this proposal to the class. The score for this part of the assignment will consist of a weighted average of your classmates' evaluation of the proposal pitch and the instructor's rating.

Grading:

Midterm 1: 25% Midterm 2: 25% Proposal / paper: 35% Proposal "pitch" / paper presentation: 15%
Grades will be assigned according to the following tentative scheme. Ranges may be lowered but will not be raised. For undergraduates: A: 85-100%; B: 75-84%; C: 60-74%; D: 50-59% ; E: 0% - 49%. For graduate students: A: 85-100%; B: 75-84%; C: 60-74%; E: 0% - 59%.

Important Dates:

Midterm examination 1: February 14
Spring break (TBA)
Midterm examination 2: April 18
Paper due: April 30
Last day of classes (TBA)
Final examination presentations: (TBA)

Mid-term Grades (for undergraduates): Mid-term grades will be posted in myUK by the deadline established in the Academic Calendar (<http://www.uky.edu/Registrar/AcademicCalendar.htm>)

Course Policies:

Attendance: Lecture attendance is mandatory. Material will be covered in class that is not presented in the textbook or suggested readings. If you miss lecture with an excused absence, you are responsible for finding out what was covered.

Make-up Exams: *It is extremely important to take all exams when scheduled.* Formal written excuses consistent with University regulations will be required for each exam absence before a makeup exam can be scheduled. Makeup exams for students with excused absences will be scheduled in accordance with the student's schedule. Failure to take an exam or provide a formal written excuse consistent with University regulations will result in 0 credit for that examination. Notice of intended absence due to a religious holiday must be presented in writing two weeks before the first exam.

Dropping the Course: The last day to drop this course without it appearing on your transcript is February 1. The last day to withdraw from this course is November 7, except for urgent non-academic reasons related to extended illness or equivalent distress.

Excused Absences

Students need to notify the professor of absences prior to class when possible. *Senate Rules 5.2.4.2* defines the following as acceptable reasons for excused absences: (a) serious illness, (b) illness or death of family member, (c) University-related trips, (d) major religious holidays, and (e) other circumstances found to fit "reasonable cause for nonattendance" by the professor.

Students anticipating an absence for a major religious holiday are responsible for notifying the instructor in writing of anticipated absences due to their observance of such holidays no later than the last day in the semester to add a class. Two weeks prior to the absence is reasonable, but should not be given any later. Information regarding major religious holidays may be obtained through the Ombud (859-257-3737, http://www.uky.edu/Ombud/ForStudents_ExcusedAbsences.php).

Students are expected to withdraw from the class if more than 20% of the classes scheduled for the semester are missed (excused) per University policy.

Per *Senate Rule 5.2.4.2*, students missing any graded work due to an excused absence are responsible: for informing the Instructor of Record about their excused absence within one week following the period of the excused absence (except where prior notification is required); and for making up the missed work. The professor must give the student an opportunity to make up the work and/or the exams missed due to an excused absence, and shall do so, if feasible, during the semester in which the absence occurred.

Verification of Absences

Students may be asked to verify their absences in order for them to be considered excused. *Senate Rule 5.2.4.2* states that faculty have the right to request "appropriate verification" when students claim an excused absence because of illness, or death in the family. Appropriate notification of absences due to University-related trips is required prior to the absence when feasible and in no case more than one week after the absence.

Academic Integrity

Per University policy, students shall not plagiarize, cheat, or falsify or misuse academic records. Students are expected to adhere to University policy on cheating and plagiarism in all courses. The minimum penalty for a first offense is a zero on the assignment on which the offense occurred. If the offense is considered severe or the student has other academic offenses on their record, more serious penalties, up to suspension from the University may be imposed.

Plagiarism and cheating are serious breaches of academic conduct. Each student is advised to become familiar with the various forms of academic dishonesty as explained in the Code of Student Rights and Responsibilities. Complete information can be found at the following website: <http://www.uky.edu/Ombud>. A plea of ignorance is not acceptable as a defense against the charge of academic dishonesty. It is important that you review this information as all ideas borrowed from others need to be properly credited.

Senate Rules 6.3.1 (see <http://www.uky.edu/Faculty/Senate/> for the current set of *Senate Rules*) states that all academic work, written or otherwise, submitted by students to their instructors or other academic supervisors, is expected to be the result of their own thought, research, or self-expression. In cases where students feel unsure about a question of plagiarism involving their work, they are obliged to consult their instructors on the matter before submission.

When students submit work purporting to be their own, but which in any way borrows ideas, organization, wording, or content from another source without appropriate acknowledgment of the fact, the students are guilty of plagiarism.

Plagiarism includes reproducing someone else's work (including, but not limited to a published article, a book, a website, computer code, or a paper from a friend) without clear attribution. Plagiarism also includes the practice of employing or allowing another person to alter or revise the work, which a student submits as his/her own, whoever that other person may be. Students may discuss assignments among themselves or with an instructor or tutor, but when the actual work is done, it must be done by the student, and the student alone.

When a student's assignment involves research in outside sources or information, the student must carefully acknowledge exactly what, where and how he/she has employed them. If the words of someone else are used, the student must put quotation marks around the passage in question and add an appropriate indication of its origin. Making simple changes while leaving the organization, content, and phraseology intact is plagiaristic. However, nothing in these Rules shall apply to those ideas, which are so generally and freely circulated as to be a part of the public domain.

Please note: Any assignment you turn in may be submitted to an electronic database to check for plagiarism.

Accommodations due to disability (boilerplate)

If you have a documented disability that requires academic accommodations, please see me as soon as possible during scheduled office hours. In order to receive accommodations in this course, you must provide me with a Letter of Accommodation from the Disability Resource Center (DRC). The DRC coordinates campus disability services available to students with disabilities. It is located on the corner of Rose Street and Huguelet Drive in the Multidisciplinary Science Building, Suite 407. You can reach them via phone at (859) 257-2754 and via email at drc@uky.edu. Their web address is <http://www.uky.edu/StudentAffairs/DisabilityResourceCenter/>.

Tentative Course Schedule

Jan. 10: Introduction and presentation of course expectations

Jan. 12: Review of relevant molecular orbital theory

Jan. 15: MLK Holiday

Jan. 17 – 31: Film-forming technologies and thin-film analysis

Feb. 2 – 12: Transport in organic films and relevance to different device types

Midterm examination 1: February 14

February 16 – 26: Organic transistors

February 28 – March 16: Organic solar cells

Spring break (TBA)

March 26 – April 16: Light-emitting diodes and electrochromic materials

Midterm examination 2: April 18

April 20 – April 27: Complex organic circuitry and large-scale manufacturing.

Paper due: April 30

Last day of classes (TBA)

Final examination presentations: (TBA)